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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,264	10/04/2005	Kimiaki Tsutsui	273634US0PCT	1847
22850	7590	04/28/2009		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
LSTVOYB, GREGORY				
ART UNIT		PAPER NUMBER		
1796				
NOTIFICATION DATE		DELIVERY MODE		
04/28/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/538,264

**Applicant(s)**

TSUTSUI ET AL.

**Examiner**

GREGORY LISTVOYB

**Art Unit**

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/10/2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 4-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/CIS-100)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date 8/3/2007.

### **DETAILED ACTION**

This Office Action is issued as a result of Applicant Remarks filed on 4/10/2009. Final Action filed on 1/22/2009 has been withdrawn.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4-19 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 claims 10 to 100% of component A and 10-100% of component B. This statement is unclear, because at more than 90% of each component it became impossible to maintain the content of other component at the claimed level. For instance if the content of component A is 95%, the content of component B can not be higher than 5%.

Claims 6 and 10 have the same issues.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

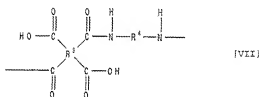
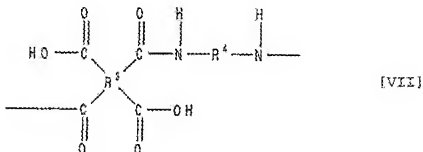
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and



where R1 is a tetravalent organic group constituting a tetracarboxylic acid which has an alicyclic structure, meeting the limitations of Claim 4 (see Abstract) and R2 is a bivalent organic group constituting a diamine.

Sawahara teaches that R1 is bicyclo[3,3,0]octane-2,4,6,8-tetracarboxylic dianhydride (BODA) (see Example 1), which is the same material as uses in the Application.

In addition, Sawahara discloses a polyimide, having formula (VII):



where R3 is a tetravalent organic group constituting a tetracarboxylic acid, and R4 is a bivalent organic group constituting a diamine, such as one having repeating CH2 groups in the structure (i.e. 1,2-diaminoethane, 1,3-diaminopropane, 1,4-

diaminobutane and 1,6-diaminohexane, see Column 8, line 35)). In reference to Claim 8, Sawahara teaches 100% of aromatic diamine in the polyamide structure (see Example 1)

Sawahara teaches that polyamic acids of structures (I and VII) or polyamic acid and polyimide can be used together in preparation of a liquid crystal aligning agent (see Example 10).

Regarding Claim 5, 6 and 8-11 Sawahara teaches 10% -80% of alicyclic tetracarboxylic acid anhydride and aromatic tetracarboxylic acid dianhydride (i.e. pyromellitic, see Column 7, line 50). The advantage of having aromatic dianhydride in the polyimide structure is well known in the art. The addition of aromatics, for instance, among other advantages, increases Young modulus of the film and decreases water uptake.

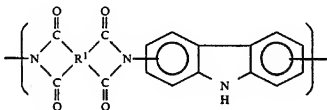
Therefore, it would have been obvious to a person of ordinary skills in the art at the time of the invention was made to use reasonable amount of aromatic tetracarboxylic acid dianhydride (i.e. 20% mol or more) in order to increase Young modulus of the film and decreases water uptake.

Regarding claims 7 and 12-18, Sawahara teaches that his aligning film is used as a part of a liquid crystal display device (see Column 1, line 5). Hence, all variations of structures, disclosed above are aligning films used in liquid crystal display device.

Regarding claim 19, Sawahara teaches a first substrate, a second substrate, a spacer, where first and second substrates separated by spacer (see Example31).

Sawahara does not teach a polyamic acid having carbazole group.

Kawada teaches a polyimide obtained by cyclodehydration of a polyamic acid (dehydrating to cause ring closure, column 4, lines 60-63), obtained by reacting tetracarboxylic acid dianhydride with diaminocarbazole (column 4, lines 64-65) with the following formula:



where R1 can be represented by cyclopentane tetracarboxylic anhydride (meeting the limitations of Claim4) or aromatic tetracarboxylic anhydride (meeting the limitations of claim 5) (see Table 1).

Kawada teaches a polyimide obtained by cyclodehydration of a polyamic acid (dehydrating to cause ring closure, column 4, lines 60-63), obtained by reacting one tetracarboxylic dianhydride with diaminocarbazole (column 4, lines 64-65).

Kawada teaches that his polymer can be used in optical devices, such as solar batteries (see Column 1, line 15). Kawada teaches that his material possesses good heat stability, workability of forming into a desired shape, easiness of production and inexpensiveness. Kawada teaches that his polyimide possesses high heat stability (see Table 1), which is important to liquid crystal alignment film. In addition, due to the presence of active NH group in a carbazole ring, good peeling resistance is expected due to Hydrogen bond interaction between the polymer and a substrate.

Therefore, it would have been obvious to a person of ordinary skills in the art at the time of the invention was made that use such monomer as diaminodiphenylamine in range of 10-100% in Sawahara's polyimide precursor allows to prepare liquid crystal aligning agent with high heat stability, good workability, easiness of production and inexpensiveness, as well an enhanced resistance to peeling.

Sawahara does not disclose volume resistivity values for his composition as it claimed in Claim 1.



However, he discloses a high voltage holding ratio (see Example 10), which depends on a polyamide structure and characterizes electrical resistance of the liquid crystal aligning agent. In Examiner's position, since Sawahara and the Applicant use polyamic acids of similar structure, Sawahara's composition as modified with Kawada, would have a volume resistivity values between  $10E10$  to  $10E14$  Ohm/cm.

### ***Response to Arguments***

Applicant's arguments filed on 10/29/2008 have been fully considered but they are not persuasive.

Regarding rejection under 35 USC 103(a), Applicant argues that The Kawada, at best, discloses that carbazole-containing polyimides have the same heat resistance as conventional polyimides but does not disclose or suggest that the inclusion of a carbazole will lead to improved heat stability.

This is incorrect. Kawada teaches a polymer with superior environmental stability (Column 3, line 30), such as heat resistance and solvent resistance (see Column 5, line 65).

As an additional motivation for adding polyimide having a carbazole ring workability of forming into a desired shape, easiness of production and inexpensiveness

Kawada should be mentioned. In addition, due to the presence of active NH group in a carbazole ring, good peeling resistance is expected due to Hydrogen bond interaction between the polymer and a substrate.

Regarding Sawahara, Applicant argues that Example 10 does not disclose a mixture of polyamic acids but instead discloses a mixture that contains a polyamic acid component and a polyimide component.

However, Claim 1 does not require two polyamic acids. Instead, it claims two polyamic acids or polyamic acid and polyimide.

Applicant argues that physical characteristics, claimed in claim 1 are not met by Sawahara.

However, Sawahara modified with Kawada would meet all the physical characteristics claimed, since the content of Applicant's and Sawahara's modified compositions would be identical.

Examiner agrees with Applicant's arguments regarding rejection under 35 USC 102(b). This rejection is withdrawn.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY LISTVOYB whose telephone number is (571)272-6105. The examiner can normally be reached on 10am-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571-272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James J. Seidleck/  
Supervisory Patent Examiner, Art Unit 1796  
GL

